High Performance Dual Band Photodetector Arrays for MWIR/LWIR Imaging, Phase I

Completed Technology Project (2007 - 2007)

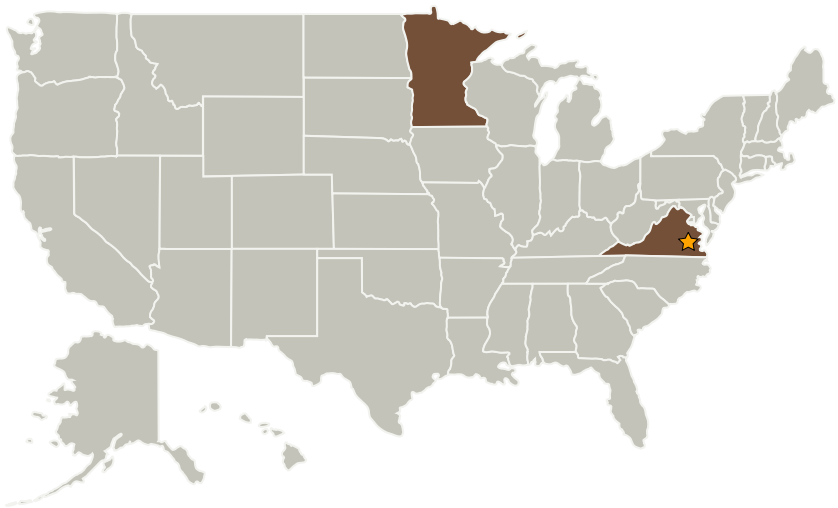
Project Introduction

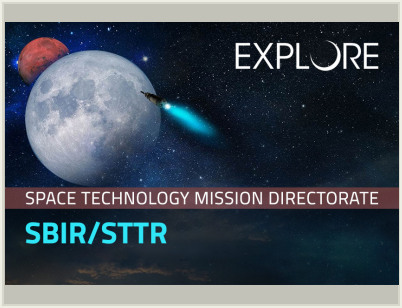
Hyperspectral imaging arrays offer far more data and the ability to discriminate objects being observed. Continued difficulties with applying HgCdTe materials, especially for LWIR, present an opportunity for the development of alternate materials. One such candidate for MWIR/LWIR photodetectors are short period Type-II superlattices based on InAs/GaInSb. This material system has the ability to tune the cutoff wavelengths during device fabrication and yet be amenable to the creation of multi-spectral serially-positioned pixels. One of the issues this Phase I program will address is the intermixing of Arsenic and Antimony at the superlattice interfaces, which can hamper LWIR operation. Improved superlattice growth will be achieved through the application of newly developed MBE apparatus. At a second level, device performance will be enhanced by novel passivation of the pixel sidewalls. The Type-II superlattices with then be applied to the creation of dual-wavelength photodetectors for MWIR/LWIR imaging.

Anticipated Benefits

Potential NASA Commercial Applications: Military missile defense systems can benefit from dual-band IR imaging array, particularly for detecting and tracking inbound objects. These arrays can also find application to infrared-based chemical identification systems and terrestrial mapping.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
SVT Associates	Supporting Organization	Industry	Eden Prairie, Minnesota

Primary U.S. Work Locations	
Minnesota	Virginia

Project Transitions

January 2007: Project Start

July 2007: Closed out

Closeout Summary: High Performance Dual Band Photodetector Arrays for MW IR/LWIR Imaging, Phase I Project Image

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Yiqiao Chen

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes